

*Landsburg / SIT 7.14*

**Responsiveness Summary for Public Comments  
on the  
Remedial Investigation and Feasibility Study  
for the  
Landsburg Mine Site**

**November 1996**

November 18, 1996

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*The following responses have been prepared received by the Washington State Department of Ecology for the Remedial Investigation and Feasibility Study Site dated February 1996.*

*The responses are numbered to correspond to the comments contained in written correspondence and/or Public Meeting held on March 27, 1996 at the Maple Valley, Washington. These specific comments have been indicated and numbered on the attached correspondence and court reporter's transcript.*

*No changes were made to the Remedial Investigation and Feasibility Study based on comments received and the study is considered final.*

*Copies of the Remedial Investigation and Feasibility Study documents related to the Landsburg Mine Site are available at the following locations:*

<i>Maple Valley Public Library</i>	<i>D</i>
<i>23730 Maple Valley Highway</i>	<i>N</i>
<i>Maple Valley, WA 98038</i>	<i>3</i>
	<i>B</i>
	<i>(2)</i>

*If you have questions about this responsiveness information about this site, please call Ecology Specialist, Marianne Deppman, at (206) 649-7111.*

**ITEM #1****Letter from Mr. Terry Seaman****Corresponding Secretary****Greater Maple Valley Area Council****not dated/ received by Ecology on April 5, 1996**

- 1 a. Immediately after concern regarding cancer cases in the vicinity of the Landsburg Mine Site was raised, Ecology reviewed the groundwater data for the site. This review concluded that the well serving the person who raised this issue was upgradient from the Landsburg Mine Site and could not be impacted by the site. The matter was referred to the Washington State Department of Health (WDOH). WDOH made several attempts to contact the person who raised the issue but was unable to reach him either by telephone or by certified mail.

The Department of Ecology has forwarded this comment (and other related comments) to the Washington State Department of Health (Mr. Lou Kittle) and the Seattle-King County Department of Public Health (Mr. David Hickock) for further evaluation.

- 1 b. The Feasibility Study presented a potential monitoring program to facilitate comparisons of the various remedial alternatives. A final decision has not yet been reached on the monitoring period for the remediated Landsburg Mine site. The final groundwater monitoring program will be presented as part of the Cleanup Action Plan (CAP). This document will be subject to future public review and comment prior to final approval by the Department of Ecology.

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**ITEM #2****Letter from Mr. Greg Wingard****Waste Action Project****not dated /received by Ecology on April 26, 1996**

- 2 a. The Department of Ecology directed Palmer Coking Coal Company to analyze its historic records in detail. The records indicate surface coal mining was conducted on the southern end of the Landsburg coal seam, an approximate two-acre site, which is located approximately 650 feet southeast of the mining operations conducted on the Rogers coal seam. This surface mining was conducted by the Palmer Coking Coal Company during the period 1976 through 1977. Following surface coal extraction, a permit was obtained from the Washington State Department of Natural Resources to allow the placement of "land clearing debris and non-putrescible demolition material". Records of the Palmer Coking Coal Company indicate this surface excavation area was used for the disposal of stumps, brush and demolition debris during the period of June, 1978 through April 1980. This debris was off-loaded

from trucks adjacent to the surface excavation and was pushed by bulldozers into the excavation from the eastern or southern side of the excavation. Some of the debris was then covered with stockpiled overburden and coal spoil materials. Records indicate that the Landsburg surface mine accepted perhaps 10,000 cubic yards of material. On a percentage basis, approximately 85% of the material was stumps, brush and wood. About 10% was construction and demolition debris, and the other 5% was concrete, dirt, rubble, and other inert materials. No evidence has been found indicating waste falling under the authority of the Model Toxics Control Act is present. Should such evidence come to light in the future, Ecology will consider it at that time.

- 2 b. There appears to be some conflict and confusion with regard to this issue due to unclear earlier interviews of former mine workers conducted as part of the RI/FS. Because of the importance of this issue, additional interviews were conducted with the miners. Although, earlier interviews with a mine supervisor indicated second hand knowledge of some odors in the mine and a reference to some oil occurring in the southern sump located at the fourth level, subsequent interviews with the actual miners, and in particular miners responsible for sump operations at the southern end of the mine (Mr. Bob Morris, miner/<sup>1</sup>cager and Mr. Bud Simmons, mine superintendent and safety officer), indicate there is no first hand evidence that waste placed in the northern portion of the trench migrated to the southern portions of the mine. The only material noted in the southern sump on the fourth level of the mine was a limited quantity of hydraulic oil from leaking mining equipment that was operating in the vicinity of the sump. A small amount of this hydraulic oil as it mixed with mud and coal dust was skimmed from the sump and was stored in a 55-gallon drum. Mr. Bud Simmons, Landsburg Mine superintendent and health and safety officer, indicated that less than one 55-gallon drum of hydraulic oil mixed with mud and coal dust was collected from the sump over a several year period. Mr. Bob Morris was the cager at the south end of the fourth level and was responsible for the sump. Mr. Morris indicated that the sump was routinely cleaned out every day to clean the pump screens and remove wood debris and silt which was then hauled out of the mine in a coal car. Mr. Morris noticed only hydraulic oil in the south sump which has a distinctive milky appearance in water. He did not notice any solvent or fuel odor in the water or in the sediment removed from the sump. No "solvent", chemical or fuel odor was ever noticed by Mr. Bud Simmons who as the health and safety officer for the Landsburg Mine would have noticed and investigated any such odors. While it is possible that some miners may have smelled some odors that could have been carried throughout the operational portion of the mine by the active ventilation system, no evidence exists to indicate that any waste disposed in the mine surface trench to the north ever migrated to the southern portion of the Landsburg Mine during the subsurface mining when the mine was being actively dewatered.

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<sup>1</sup> A cager is responsible for connecting and disconnecting coal cars at the bottom of the portal incline and for maintaining sump pumps.

As noted in the RI/FS, the vast majority of drums and liquid waste disposal occurred from 1969 - 1971. It should be noted that mining activities continued during this period and for approximately four to five years after the dumping had stopped (underground coal mining on the Rogers Seam continued until 1975), and throughout that time miners even at the lowest levels of the mine did not see evidence of waste materials migrating to the south.

- 2 c. The waste within the Landsburg trench is confined to the northern half of the trench. It is correct that waste may have escaped the northern half of the Landsburg trench in the past via groundwater discharge to the north, but no migration of waste is occurring now. With respect to the waste disposal area on the south end of the Landsburg seam, there are no records indicating that any hazardous materials were ever disposed there. Please see response to comment #2a.
- 2 d. The two accessible Rogers coal seam mine portals (portal #2 and portal # 3) were closed by blasting and grading. These closed portals were located by geodetic and geophysical surveying conducted during the RI. Sediment/soil, surface water discharge and groundwater in the vicinity of these portals was sampled as part of the RI and the results are presented in the Final RI/FS document.
- 2 e. No additional openings are available for sampling. Portal #1 does not exist because it was collapsed within the mine surface subsidence trench.
- 2 f / g. The Department of Ecology recognizes that it is often difficult to know the exact history of waste disposal at any site. However, both the Department of Ecology and the Landsburg PLP Group have gathered a significant amount of information about disposal activities at the Landsburg Mine site. The historic records of the Palmer Coking Coal Company and various government agencies provide a great amount of detail. (For example, review of the Pollution Control Hearings Board file revealed that the disposal incident in 1978 did not impact groundwater and the case was dismissed). Interviews of former employees of the site provided even more information. The Department of Ecology believes that enough information is available to allow a decision to be made about remediating the site.

Regardless of the information available, the remedy at the site will be protective because it conservatively assumes that waste remains in the mine workings. The remedy therefore will provide for a low-permeability cap to prevent precipitation from reaching any waste, and will include both a long-term monitoring plan and a contingency plan for actions to be taken should long-term monitoring indicate waste begins exiting the mine. These measures will protect against the release of hazardous substances off of the site, no matter what kinds of waste might remain in the mine.

- 2 h. While field operations conducted as part of the remedial investigation during the summer of 1994 observed a cessation of surface water flow through the culvert from the artificially created pond, it is accepted that during other summers the pond may have a continuous limited surface water flow. In any case, when the surface water flow reaches the glacial outwash soils at the bottom of the hill, the surface water flow regularly ceases for a long period of time during the summer and winter.
- 2 i. The hydrogeologic model formulated in the remedial investigation is sufficient to meet the objectives of the RI/FS and to determine potential pathways of exposure. Pathways have been identified and the monitoring system which will be proposed will detect potential future releases. Response to the groundwater divide issue is presented in the response to comment #6 w.
- 2 j. Please see response to comment #6 ee-hh.
- 2 k. Ecology believes that, while not every question that may be thought of is answered in the RI/FS, the RI/FS does present sufficient information to allow Ecology to make a decision regarding a site remedy. The majority of individual comments raised in this section have been addressed in the individual comment responses provided above. Seeps and discharges around the site are controlled by site geology and mine geometry and occur (related to the Landsburg Mine Site) where the Rogers coal seam subcrops or outcrops. Sampling from seeps is always difficult and subject to interpretation. The decision in the approved site Work Plan was to utilize more reliable groundwater monitoring wells to evaluate groundwater that is emanating from the seeps and springs.
- 2 m. See comment response #2 o, below.
- 2 n. Soil sampling conducted in waste staging areas adjacent to the Landsburg Mine trench has not detected chemicals above background concentrations. A discussion of the surface mining operation on the southern end of the Landsburg seam and subsequent disposal of stumps, brush and demolition debris is provided above in response # 2 a.
- 2 o. Public concerns related to the potential incidences of cancer have been addressed under comment #4e and #1a.
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**ITEM #3.**

**Letter from Ms. Kathleen J. Toensjost and Mr. Ralph F. Toensjost**  
**Ravensdale, Washington**  
**dated: April 6, 1996**

- 3 a. Ecology will select a cleanup remedy according to criteria specified in regulation. While complete removal of any remaining waste would be the most permanent solution in the long-term, the difficulty of removal presents short-term hazards both with respect to a potentially rapid release of relatively large quantities of hazardous substances due to disturbance during recovery and with respect to hazards to cleanup workers. Complete removal is complicated by not knowing, and having no way of knowing, the nature and quantity of hazardous substances left to be removed. In light of not finding any contamination in groundwater leaving the site during the RI/FS, a major excavation and recovery operation is unlikely to be warranted. Ecology plans on approaching the site by monitoring all exposure pathways to ensure that, should any waste be detected, measures can be taken to prevent it from leaving the mine property. If waste is detected in the future, we will be in a much better position to design specific remedial actions.
- 3 b. Palmer Coking Coal Company's records are believed to be fairly reliable in terms of the quantities of material disposed in the trench. In any case, knowledge of the precise number of drums placed or gallons of waste deposited in the trench is not necessary because the pathways for potential chemical migration out of the mine have been adequately characterized and will be monitored during long-term monitoring of the site through a system of wells that will provide early detection of a release. In effect, Ecology does not plan on selecting a remedy which depends upon knowledge of past events.

With regard to the 162,600 gallons of liquid, there is no reference to solvents. It is believed that this liquid was primarily water with some mixed contaminants.

With regard to the 50,000 barrel figure cited in the Valley Daily News article of September 5, 1991, this was a very early estimate of the potential maximum amount of barrels made prior to reviewing records of operation. Record review indicates 4,563 barrels were disposed of in the trench. Again, while we can never be sure that review of old records account for every barrel, Ecology will select a remedy that does not depend upon past knowledge of the amount of waste disposed.

- 3 c. The geophysical work confirmed that zone 2 (the accessible northern portion of the trench used for waste disposal) contains a large concentration of magnetic anomalies. Based on the high density and magnitude of these anomalies, there is probably a significant concentration of ferrous debris located below the surface. This debris, based on the history of the site, probably consists principally of rusted and damaged steel 55-gallon drums.

However, household appliances and other metallic debris may also have been dumped in this area.

- 3 d. The geology of the site presented in the Landsburg Mine site RI/FS was thoroughly researched and is based on geologic mapping conducted by the U. S Geological Survey and the Washington State Department of Water Resources. The geology at the site was verified by an extensive field program, including drilling, surface backhoe trenching and geologic mapping. In addition, extensive mine records exist for several of the coal mines in the area. These mine records detail intercepted faults and other geologic structures encountered during the mining operations. Compilation of these sources of information has resulted in development of a comprehensive geohydrologic model of the site which is adequate for making protective decisions. In addition, groundwater monitoring of the site is an integral part of the recommended remedial option and is an integral part of any waste containment system under MTCA. Groundwater monitoring is not unique to this site. The groundwater monitoring system will provide for the early detection of any changes in the hydrogeologic system and the migration of contaminants from the containment system, if this should ever occur.
- 3 e. Rainwater is one of the major problems at the Landsburg Mine site and is the principal mechanism (driving force) that could move contaminants from their current position above the water table to the water table where they may be mobilized out of the trench area. The Landsburg Mine site is located on a hill and the source of recharge for the groundwater in the mine is primarily precipitation. Interviews with miners indicate that the amount of water that had to be pumped from the mine was directly related to seasonal precipitation patterns. Typically, only one pump was used to pump out groundwater (about 10 gpm) during the summer months but as much as three pumps were used to pump groundwater (about 30 gpm) during the wetter winter months. Although the actual trench (mine) is a highly conductive zone, by eliminating inflows of water through a cap and surface water diversions, very little water will enter the trench area. The cap and surface water diversion systems are key to eliminating the principle source of recharge to the Landsburg Mine site.

Note that pumping was done during mining operations to dewater the mine. Pumping has not been done since mining operations ceased in 1975. The mine has filled with groundwater which fluctuates with the seasons. Since waste exists above the water table in the mine, it is rainwater which has the potential to transport waste downward to the water table.

- 3 f. A groundwater monitoring program is an integral part of the proposed remedial alternative and will provide an early warning detection system that is protective of human health and the environment in the event of migration of contaminants out of the trench area. The groundwater monitoring program will monitor for hazardous substances at both the northern and southern end of the Landsburg Mine trench. A contingency plan will be in



place so that, if hazardous substances are detected, active measures will be taken to prevent them from leaving the mine property.

3 g. See answer 3a.

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**ITEM #4.**

Letter from Ms. Sonia S. Preedy

Ravensdale, Washington

dated: April 12, 1996

- 4 a. The explosive potential of remaining material in the trench is currently considered to be extremely low. The likelihood that there are still intact drums with significant quantities of liquids after the length of burial, fires and the impact from falling and tumbling to the bottom of the trench is considered remote. The trench backfill and cap will minimize oxygen availability for combustion.
- 4 b. A specific operation and maintenance program will be conducted at the Landsburg Mine site to routinely remove larger vegetation that has the potential to penetrate the cap. This is a common and well established practice for landfills and waste containment sites throughout the country. The specific operation and maintenance program will be presented in the Operation and Maintenance report which is part of the Cleanup Action Plan required engineering reports. These documents will be subject to future public comment and final approval by the Department of Ecology before implementation. A simple but effective option may be to plant the vegetative cover on the cap with grasses, clovers and wildflowers and to regularly mow the resulting field to prevent trees or shrubs from growing.
- 4 c. Target shooting at the site would have no detrimental impact to the cover. The backfill, clean soil layers and vegetative cap will prevent substantial penetration of projectiles.
- 4 d. Soil sampling was only conducted in the immediate vicinity of the mine trench. If chemicals had been detected in this area of potentially highest concentration, the area would have been expanded in subsequent phases of the investigative program. Since undisturbed soils samples collected in the immediate vicinity of the trench showed no chemicals above natural background levels, there was no need to expand the soil sampling program. No soil sampling was conducted on any private property outside the immediate Landsburg mine property. The record of soil testing and analysis is presented in the Final RI/FS document.
- 4 e. As previously discussed, soil sampling in close proximity to the trench has not detected chemicals above background concentrations. Therefore, it is expected that potential contaminants from ash falling on private property in

the vicinity of the Landsburg Mine site would be non-detectable, especially after 20 years of rainfall. Also, surface soil samples of private property may exhibit chemicals from domestic sources such as gardening, vehicle maintenance, painting or other domestic activities using chemicals. For this reason, it would be very difficult to determine the source of contamination, if, in fact, contamination was detected.

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**ITEM #5.**

**Letter from Mr. James Holder**  
**Hobart, Washington**  
**dated: April 10, 1996**

- 5 a. The large fires that burned in the Landsburg mine trench (Rogers coal seam) during the summer of 1971 undoubtedly consumed a large quantity of the waste material that had been disposed of into the trench. As discussed in the Final RI/FS, several other mechanisms or a combination of these mechanisms, including contaminants being flushed from the highly permeable trench/mine system and/or immobilized by adsorption to remaining carbon-rich and clay-rich materials in the mine, may have contributed to investigations finding no contaminants leaving the Landsburg Mine site at concentrations above background levels.
  - 5 b. The utilization of the stockpiles of "coal slag" and clay material around the Landsburg Mine site for backfill and cap construction material is currently under evaluation by the PLP Group and their consultants. Preliminary designs for the containment system are evaluating the utilization of carbon-rich and clay-rich soils and materials as backfill placed directly above the existing base of the trench and as low-permeability capping source material. Additional geotechnical sampling of these materials will be conducted and presented as part of the Cleanup Action Plan engineering reports. Final design of the trench containment system and cap including potential utilization of the existing "coal slag" and other mine waste will be presented in these documents.
  - 5 c. Ecology will seek to implement a remedy which fulfills regulatory requirements in a manner which makes sense for the site. We hope most people will find the final remedy selected a "common sense" solution. However, please keep in mind that individuals view what constitutes "common sense" in a given situation differently. What seems to be a "common sense" approach to one person may not seem so to another.
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**ITEM #6.****Letter from Mr. Don E. Wickstrom****Director of Public Works****City of Kent****dated: April 25, 1996**

- 6 a. The Department of Ecology is sensitive to the City of Kent's concern for their water supply, as is the Landsburg Mine site PLP Group. This concern has expressed itself in the RI/FS through a conservative approach to the proposed remediation and monitoring programs at the Landsburg Mine site. Information collected to date indicates that waste was not placed in the southern portion of the trench and that the water flow in the trench (and certainly that portion of the trench overlain by waste) is primarily to the north. Despite this the monitoring program (the final version will be presented in the Cleanup Action Plan) will monitor both ends of the trench using existing wells and will provide for a contingency remediation plan in the event that contaminants are detected.
- 6 b-f. It is acknowledged there is waste in the source area. The methodology for conducting the RI, however, focused on characterizing potential pathways and the nature of chemicals exiting the mine rather than the specific contents of the mine itself. This approach was fundamental to the RI because, as discussed in the Work Plan, the waste materials present in the trench would be very difficult to completely characterize due to dangers and hazards associated with drilling and sampling in the subsidence trench, the highly heterogeneous nature of "landfilled" material, and the complexity of the collapsed Landsburg Mine. As long as the relevant pathways of chemicals potentially exiting the mine are adequately characterized and monitored for early warning of a release, evaluation of remedial approach is not compromised by incomplete characterization of the waste.
- 6 g. Please see response to Comment #2 a (from Mr. Greg Wingard).
- 6 h, j-m. It is acknowledged that there are a number of possible scenarios and that other scenarios beyond those presented in the RI may also be applicable. The four which were postulated in the RI were presented as potential scenarios which may have contributed to the attenuation of wastes and to help explain the observed lack of chemicals in groundwater. The remedial measures evaluated in the FS, however, account for the possibility that waste may remain. In fact, the FS conservatively assumes that a significant volume of waste is present.
- 6 i. It is agreed that there are other possible scenarios, such as the contaminants not yet having migrated to the mine portal discharge points. However, based on the site hydrogeologic model developed from field investigations and discussions with former miners regarding water flow in the mine, the site's monitoring wells are located in the most direct pathways for early detection monitoring. It is possible at any site using a containment remedy

that there may be detectable releases in the future, and therefore long-term monitoring is a key part of the overall remedial approach for the site.

- 6 n. The presence of organic chemicals in groundwater always warrants attention. The compounds detected at PW-9 and PW-10 were observed at very low levels just above the method detection limits, and none of the compounds were detected more than a single time during the four monitoring events. Also, none of the detections exceeded any potential regulatory or risk-based criteria. Therefore, it is believed detection of the organic compounds do not represent true contamination, nor do they constitute a significant health risk.

In addition, well PW-9 is not located downgradient of the south portal of the Rogers seam. These compounds were not detected in the site's monitoring wells, which are located in the most direct pathways for detection of chemicals exiting the mine. With regards to the potential waste disposal area as a possible source, please see the response to comment #2a.

- 6 o. Please see Section 3.6.4 "Conceptual Model of Site Groundwater Flow". This section incorporates all observations into a single comprehensive discussion and descriptive model.
- 6 p. Both hydrogeologic and discussions with former miners indicates that water flow within the trench is primarily to the north, particularly for the northern portion of the trench where waste was placed. However, because site groundwater monitoring accounts for the possibility of discharge from either end of the mine, the performance of a water balance would not be expected to affect the decision made in the FS regarding a preferred remedy. It is intended that long-term monitoring account for all potential releases from the site. The monitoring plan will be developed as part of the Cleanup Action Plan.
- 6 q. See comment 6 p.
- 6 r. Comment is acknowledged. No response is necessary.
- 6 s. As stated earlier, the pathways of potential contaminant movement from the mine have been identified, and a site monitoring system will be developed which will provide for early detection of chemicals exiting the mine. Therefore, while some uncertainties remain, such as with regard to the nature or quantity of chemicals deposited in the trench or the precise location of the groundwater divide, a monitoring system which accounts for the possibility of discharge at either end of the mine can be developed. A specific ground water monitoring plan will be proposed in the Cleanup Action Plan, and will be subject to public comment.
- 6 t. Groundwater elevations at the south end of the mine are not considered anomalous. The south end of the mine is at a higher topographic elevation than the north end. Typically, groundwater flow occurs as a subdued

reflection of ground surface topography. Since the south end of the mine occurs at a higher topographic elevation than the north end, it is therefore not surprising that the groundwater elevation is also higher at the south end.

- 6 u. It is important to realize that the observance of a pressure response at LMW-1 during Baker tank water disposal is not evidence that flow occurred to the south from the north portal. Instead, the addition of water to the trench created a pressure gradient response. The water level increase at LMW-1 was simply a result of the fact that pressure is exerted in all directions, not that actual flow of water occurred towards LMW-1. Figure B-1 in Appendix B clearly shows that the groundwater elevation at LMW-1 was always higher than the elevation at the LMW-2 and -4 indicating that ground water occurring at the north portal did not flow to the south during the period over which measurements were taken .

Groundwater levels within the mine of the Rogers Seam are controlled by the elevation of the north and south portals. Groundwater flow has stabilized since the cessation of pumping at the completion of mining operations. Since the north portal is at a lower elevation than the south portal, groundwater flow within the northern portion of the mine is now and is anticipated to remain toward the north portal.

- 6 v. First, there is significant groundwater flow out of the Rogers coal seam and the Landsburg Mine to the north. The fact that water does not discharge at the ground surface at portal 2 does not indicate that subsurface discharge is not occurring from the north end of the mine. Discharge certainly does occur since there is a gradient (between LMW-1 and LMW-2/-4 for instance), and the trench is highly permeable and capable of conducting a significant quantity of water. The subsurface materials between the north portal (portal 2) and the road are highly permeable as the Rogers coal seam was surface mined to a depth of about 15 to 20 feet and backfilled with gravel. Additional evidence of this substantial discharge of groundwater to the north consists of the numerous seeps and springs which have been observed along the trace of the Rogers coal seam on the hillside going down to the Cedar River Valley.

Second, the south portal represents a shallow depression (resulting from blasting and bulldozing the portal closed) which also collects surface runoff from the surrounding area as well as subsurface flow which occurs in the gravel immediately underlying the ground surface. The flow of water measured at the south portal site therefore often represents a combination of mine portal outflows, as well as general surface runoff and shallow groundwater flow in the recessional gravel on the hillside above the south portal area.

- 6 w. The RI/FS report acknowledges some uncertainty with respect to the nature of the groundwater divide but it still makes a reasonable estimate of its location. Exploration for a more precise location of the groundwater divide is unnecessary. Given the hydrogeologic system at the Landsburg mine site,

an adequate and conservative approximation of the groundwater divide was made using the topographic high point of the hill. The precise location of the groundwater divide is unnecessary, however, since the preferred remedial alternative accounts for all possible migration scenarios. It should also be noted that because of the reduction in rainfall infiltration and diversion of surface water away from the northern portion of the trench which would result from remedial action, the groundwater divide is expected to change toward the south relative to its current position. The long-term monitoring of the trench is intended to address all potential releases.

- 6 x. See response to comment #2 b. The fact that miners working on a daily basis at the fourth level of the mine did not observe evidence of waste at the south end of the mine even after approximately five years is evidence that disposal in the northern portion of the trench did not migrate to the southern portion of the trench during the period in which mining operations were conducted. Again, the remedial alternative preferred in the FS conservatively assumes the possibility of discharge at either end. Long-term monitoring at both ends of the trench is a key part of the overall remedial approach for the site, and the site's monitoring wells are located in the most direct pathways for early detection monitoring.
- 6 y. No response is necessary. However, it is important to note that interviews with former miners did not indicate flow of contaminants to the southern portions of the mine even five years after dumping stopped.
- 6 z. The monitoring system which will be developed for the site will be effective at detecting releases at either end of the mine.
- 6 aa. As described in the response to comment #6 v, it is not correct that the absence of surficial discharge at the north portal is particularly significant in determining the magnitude of flow from the north end of the mine. The flow is merely occurring in the subsurface in the vicinity of the north portal and is well documented in the numerous springs and seeps along the Rogers coal seam in the Cedar River Valley. Also, it is not clear why the commenter considers the hydraulic conductivity for LMW-3, which is located at the south end of the mine, more representative of the north end than hydraulic conductivity values measured at wells LMW-2 and LMW-4, located at the north end. The values of hydraulic conductivity for LMW-2 and -4 are significantly higher than measured at LMW-3 and would result in significantly more discharge than the 0.5 gpm estimate indicated in the comment.
- 6 bb. Ecology believes the hydrogeologic model presented in the RI/FS is conceptually correct, although the relative magnitudes of flow at the north and south portals may not be known as accurately as the commenter wishes.
- 6 cc. It is acknowledged that flow through fractures or shear zones was an initial concern at this site. Work conducted under the RI specifically was aimed at evaluating whether such zones could serve as conduits for flow of chemicals

away from the mine. The preponderance of evidence collected during the RI, however, indicates that these zones do not play a significant role in transmitting water laterally away from the mine. Please see the discussion in Section 3.6.4.1. Most important in this conclusion were: (1) mine reports which indicated faults are tight and do not produce significant quantities of water, (2) geochemical analyses which indicated that private wells in the area display a significantly different geochemical signature, and (3) water level measurements throughout the Study Area.

Also, it should be noted that LMW-1 is not installed within intact sandstone as the commenter suggests, and the hydraulic conductivity reported for the well, while possibly representing an upper bound on the range of possible values, is not representative of undisturbed sandstone. The well was intended to be completed within or very near the rock tunnel connecting the two portions of the mine separated by a fault. During drilling, tremendous lost circulation was encountered as well as numerous fractures, and the well is installed in close proximity to the mine shaft. The hydraulic conductivity of intact sandstone, is expected to be much smaller than the value reported for LMW-1. The hydraulic conductivity of intact shale and siltstone would be smaller still.

- 6 dd. Ecology will consider the Clark Springs Wellhead Protection Plan during development of the Cleanup Action Plan.
- 6 ee-hh. MTCA sites are exempted from the procedural requirements of the *Dangerous Waste Regulations*, Chapter 173-303 WAC. Ecology may apply any requirements of the chapter which it deems appropriate. Ecology will review the *Dangerous Waste Regulations* during preparation of the Cleanup Action Plan, and incorporate any requirements deemed appropriate.
- 6 ii. Ecology will consider the necessary length of the cap during preparation of the Cleanup Action Plan.
- 6 jj. The definition of "Reduction in Toxicity, Mobility and Volume" is provided in Section 9.4.3. It consists of the degree to which a remediation alternative reduces the inherent toxicity, ability of contaminants to migrate in the environment, or the quantity of contaminated material. The relative reduction in infiltration was taken as an objective measure of the long-term effectiveness criterion. It would be redundant to also include it under the reduction in toxicity, mobility and volume criterion. Based on the definition for reduction in toxicity, mobility and volume, all of the capping alternatives should receive the same score.

Regarding the length of the cap, see response to comment #6 ii.

- 6 kk. Ecology uses analyses such as the incremental comparison presented in the RI/FS as a guide to selecting a cleanup action. In developing the Cleanup Action Plan, the adequacy of the PLP-preferred remedy presented in the FS will be re-evaluated with the information provided in the RI/FS.

- 6 ll. See response to comment #1 b. The groundwater monitoring program will be developed as part of the Cleanup Action Plan.
- 6 mm. The Monitoring Plan will be included as part of the Cleanup Action Plan document. These documents will be subject to public review and comment prior to final approval by Ecology.
- 6 nn. Ecology will consider whether additional monitoring wells are necessary when developing the Cleanup Action Plan.
- 6 oo. It is agreed that a contingent groundwater treatment system is an important element that should be included as part of the overall remedy for the site. This could consist of a pre-designed, off-the-shelf system which could be rapidly deployed to the site in the event of a release. The system could be modular so as to be capable of handling a variety of contaminants. The design of all contingency systems will be presented as part of the Cleanup Action Plan (CAP).
- 6 pp. Ecology believes the RI/FS contains sufficient information to make a remedial decision. As such, it constitutes the final RI/FS. We will work with the City of Kent and the Landsburg PLP Group to address issues of concern in the Cleanup Action Plan and the Consent Decree which will implement the CAP.
- 6 qq. It is not the aim of an RI to eliminate all uncertainty, only to gather sufficient information to support an informed risk-management decision. While some uncertainties remain, Ecology believes a remedy can be selected which takes these uncertainties into account.
- 6 rr. The Cleanup Action Plan, and particularly the monitoring program, will account for the possibility of contaminants eventually discharging from the Landsburg Mine at either end.
- 6 ss. In order to approach the site conservatively, groundwater monitoring will be at both ends of the mine.
- 6 tt. See response to comment #1 b.
- 6 uu. The Department of Ecology will make all monitoring results readily available to the public, and arrangements can be made with Ecology to provide results to the City of Kent in a timely manner.
- 6 vv. Please see response to comment #2 a.
- 6 ww. Please see responses to comments #6 ee-ii.
- 6 xx. Please see response to comment #6 dd.
- 6 yy. Please see response to comment #6 oo.



6 zz. Please see response to comment #6 pp.

6 aaa. No response necessary.

6 bbb. No response necessary.

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**ITEM #7.**

**Formal comment from Ms Wendy Melewski**

**Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 62.**

**March 27, 1996**

- 7 a. The monitoring program for the Landsburg Mine site is anticipated to utilize multiple monitoring wells at both the north and the south ends of the mine. These specially designed wells monitor groundwater at various depths within the hydrogeologic system. The wells provide the earliest detection of any potential contaminants migrating from the Landsburg Mine site and allow for rapid response to the groundwater contamination before contaminants are mobilized any significant distance off the Landsburg Mine site. Monitoring private wells provides very little if any additional benefit over utilizing properly installed monitoring wells specifically designed to monitor the Landsburg hydrogeologic system. The anticipated groundwater monitoring system will not use private wells for the ongoing groundwater monitoring; in the unlikely scenario that contaminants are detected at the monitoring wells, additional wells including some private wells may be sampled for additional data.

In particular, the well owned by Ms. Wendy Melewski is not located downgradient of the Landsburg Mine site and is not the recipient of groundwater from the Landsburg Mine. The elevation of groundwater within the Melewski well is higher than the groundwater within the Landsburg Mine site trench. In addition, the underground mine workings within the Landsburg coal seam (located between the Melewski's well and the waste disposal in the Rogers seam) act as a cutoff trench draining the surrounding bedrock. The groundwater flow at the Melewski's well is toward the Landsburg coal seam and not from the coal seam toward their well. Groundwater from the Landsburg Mine site (in the Rogers coal seam) does not reach the well owned by Ms. Wendy Melewski. There is no additional benefit to a groundwater monitoring system for the Landsburg Mine site gained by incorporating the Melewski well in the groundwater monitoring system.

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**ITEM #8.**

**Formal Comment by Mr. Bill Wolinski, City of Kent Public Works  
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 64.  
March 27, 1996**

- 8 a. No formal response required. Specific comments from the City of Kent are presented in the letter from Mr. Don E. Wickstrom, Director of Public Works, City of Kent dated April 25, 1996 (comments # 6 a through 6 bbb).
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**ITEM #9.**

**Formal comment from Mr. Richard Melewski  
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 65.  
March 27, 1996**

- 9 a. See comment 1 a.
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**ITEM #10.**

**Formal comment from Mr. William Beck, Chairman-Greater Maple Valley Area  
Council  
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 66.  
March 27, 1996**

- 10 a. See response to comment # 9 a
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**ITEM #11.**

**Formal comment from Mr. Edward Woodruff  
Public Meeting for Landsburg Mine site RI/FS, Transcript pg. 70.  
March 27, 1996**

- 11 a. Mr. Edward Woodruff is correct; groundwater from the Landsburg Mine site does not reach his well. His well is a shallow (aprox. 20 ft), hand dug well located to the southeast of monitoring well LMW-7. His well is not located downgradient of the Landsburg Mine site and is not the recipient of groundwater from the Landsburg Mine site. The elevation of groundwater within the Woodruff well is higher than the groundwater within the Landsburg Mine site trench. In addition, the underground mine workings within the Landsburg coal seam located between Mr. Woodruff's well and the waste disposal in the Rogers seam act as a cutoff trench draining the surrounding bedrock. The groundwater flow at Mr. Woodruff's well is similar to that at

November 18, 1996

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the Melewski's well in that it is toward the Landsburg coal seam and not from the coal seam toward their well.

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End of Responses

